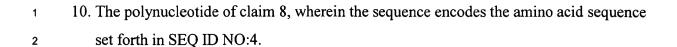
CLAIMS

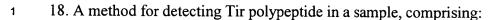
What is claimed is:

- 1. A substantially purified translocated intimin receptor (Tir) polypeptide that binds intimin.
- 2. The polypeptide of claim 1, wherein the unphosphorylated polypeptide has a molecular weight of about 78 kilodaltons as determined by SDS-PAGE under reducing conditions.
- The polypeptide of claim 1, wherein the polypeptide is secreted by an attaching and effacing (A/E) pathogen.
- 4. The polypeptide of claim 3, wherein the polypeptide is secreted by enteropathogenic *E. coli*.
- 5. The polypeptide of claim 3, wherein the polypeptide is secreted by enterohemorrhagic *E. coli*.
- 6. The polypeptide of claim 1, wherein the polypeptide has an amino acid sequence as set forth in SEQ ID NO:2.
- 7. The polypeptide of claim 1, wherein the polypeptide has an amino acid sequence as set forth in SEQ ID NO:4.
- 8. An isolated polynucleotide encoding the polypeptide of claim 1.
- 9. The polynucleotide of claim 8, wherein the sequence encodes the amino acid sequence set forth in SEQ ID NO:2.





- 1 11. A polynucleotide selected from the group consisting of:
- a) SEQ ID NO:1;
- b) SEQ ID NO:1, wherein T is U;
- c) nucleic acid sequences complementary to a) or b); and
- fragments of a), b), or c) that are at least 15 nucleotide bases in length and that hybridize to DNA which encodes the polypeptide set forth in SEQ ID NO:2.
- 1 12. A polynucleotide selected from the group consisting of:
- a) SEQ ID NO: 3;
 - b) SEQ ID NO: 3, wherein T is U;
- c) nucleic acid sequences complementary to a) or b); and
 - d) fragments of a), b), or c) that are at least 15 nucleotide bases in length and that hybridize to DNA which encodes the polypeptide set forth in SEQ ID NO: 4.
- 1 13. A vector containing the polynucleotide of claim 8.
- 1 14. A host cell containing the vector of claim 13.
- 15. An anti-Tir antibody which binds to the polypeptide of claim 1.
- 1 16. The antibody of claim 15, wherein the antibody is monoclonal.
- 17. The antibody of claim 15, wherein the antibody is polyclonal.



- a) contacting the sample with the antibody of claim 15; and
- b) detecting binding of the antibody to Tir polypeptide, wherein binding is indicative of the presence of Tir polypeptide in the sample.
- 1 19. The method of claim 18, wherein the sample is tissue.
- 1 20. The method of claim 18, wherein the sample is a biological fluid.
- 21. The method of claim 18, wherein the presence of Tir polypeptide in the sample is indicative of infection by enteropathogenic *E. coli*.
- 22. The method of claim 18, wherein the presence of Tir polypeptide in the sample is indicative of infection by enterohemorrhagic *E. coli*.
- 23. A method of ameliorating disease caused by Tir-producing organism, comprising: inducing an immune response in a host with the polypeptide of claim 1, thereby
- ameliorating disease caused by infection of the host by the Tir-producing organism.
- 1 24. The method of claim 23, wherein the host is human.
- 1 25. The method of claim 23, wherein the host is bovine.
- 26. The method of claim 23, wherein the Tir-producing organism is *E. coli*.
- 1 27. The method of claim 23, wherein the Tir-producing *E. coli*. is an enteropathogenic *E.*
- 2 coli.
- 1 28. The method of claim 23, wherein the Tir-producing *E. coli.* is an enterohemorrhagic *E.*
- 2 coli.

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- 1 29. A method for detecting *tir* polynucleotide in a sample, comprising:
- 2 a) contacting a sample suspected of containing *tir* polynucleotide with a nucleic acid 3 probe that hybridizes to *tir* polynucleotide; and
- b) detecting hybridization of the probe with *tir* polynucleotide, wherein the detection of hybridization is indicative of *tir* polynucleotide in the sample.
- 30. The method of claim 29, wherein the nucleic acid probe is selected from the group consisting of:
 - a) a nucleic acid sequence set forth in SEQ ID NO:1;
- b) a nucleic acid sequence set forth in SEQ ID NO:1, wherein T is U;
 - c) a nucleic acid sequence complementary to a) or b); and
 - d) fragments of a), b), or c) that are at least 15 nucleotide bases in length and that hybridize under stringent conditions to DNA which encodes the polypeptide set forth in SEQ ID NO:2.
 - 31. The method of claim 29, wherein the nucleic acid probe is selected from the group consisting of:
 - a) a nucleic acid sequence set forth in SEQ ID NO:3;
 - b) a nucleic acid sequence set forth in SEQ ID NO:3, wherein T is U;
 - c) a nucleic acid sequence complementary to a) or b); and
- fragments of a), b), or c) that are at least 15 nucleotide bases in length and that
 hybridize under stringent conditions to DNA which encodes the polypeptide set
 forth in SEQ ID NO:4.
- 32. A method for detecting *tir* polynucleotide in a sample, comprising amplifying the *tir* polynucleotide.

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1	33. A recombinant method for producing <i>tir</i> polynucleotide, comprising
2	inserting a nucleic acid encoding a selectable marker into the polynucleotide of
3	claim 8, such that the resulting polynucleotide encodes a recombinant Tir
4	polypeptide containing the selectable marker.
1	34. A polynucleotide produced by the method of claim 33.
1	35. A host cell containing the polynucleotide of claim 34.

- 1 36. A recombinant method for producing Tir polypeptide, comprising:
 - a) growing a recombinant host cell containing a polynucleotide encoding Tir polypeptide under conditions which allow expression and secretion of Tir polypeptide; and
 - b) isolating the polypeptide.
- 1 37. A method of producing a Tir fusion protein comprising:
 - a) growing a host cell containing a polynucleotide encoding Tir operably linked to a
 polynucleotide encoding a polypeptide or peptide of interest under conditions
 which allow expression and secretion of the fusion protein; and
 - b) isolating the fusion protein.
- 38. A method of identifying a compound which interferes with the binding of a Tir
 polypeptide to intimin, the method comprising
 comparing the binding of the Tir polypeptide to intimin in the presence of the
 compound to the binding of the Tir polypeptide in the absence of the compound.

- 1 39. A method for differentiating among attaching and effacing pathogens, comprising:
- 2 a) contacting the attaching and effacing bacteria with an antibody of claim 9; and
- b) contacting the attaching and effacing bacteria with an anti-phosphotyrosine antibody.
- 40. A method for delivering a compound of interest to a Tir-containing cell, comprising:
- administering to the Tir-containing cell an intimin-containing cell delivery vehicle
- which contains a compound of interest.
- 1 41. A method for detecting cytoskeleton of a cell, comprising:
- a) contacting a cell ctyoskeleton with Tir polypeptide; and
- b) detecting the binding of Tir polypeptide to cell cytoskeleton.
- 42. A kit useful for the detection of Tir polypeptide comprising carrier means being
- 2 compartmentalized to receive in close confinement therein one or more containers
- comprising a container containing an antibody which binds to Tir polypeptide.
- 1 43. The kit of claim 42, wherein the antibody is detectably labeled.
- 1 44. The kit of claim 43, wherein the label is selected from the group consisting of
- radioisotope, a bioluminescent compound, a chemiluminescent compound, a fluorescent
- compound, a metal chelate, and an enzyme.
- 45. A kit useful for the detection of a tir polynucleotide comprising carrier means being
- 2 compartmentalized to receive in close confinement therein one or more containers
- comprising a container containing the nucleic acid probe that hybridizes to *tir*
- 4 polynucleotide.

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- 1 46. The kit of claim 45, wherein the probe is detectably labeled.
- 47. The kit of claim 46, wherein the label is selected from the group consisting of radioisotope, a bioluminescent compound, a chemiluminescent compound, a fluorescent
- compound, a metal chelate, and an enzyme.
- 48. A kit useful for the detection of a *tir* polynucleotide comprising carrier means being compartmentalized to receive in close confinement therein two or more containers comprising:
 - a) a first container containing a first nucleic acid probe that hybridizes to one of two strands of *tir* polynucleotide; and
 - b) a second container containing a second nucleic acid probe that hybridizes to the other of two strands of *tir* polynucleotide.
- 49. A method for inducing a cell mediated immune response to a polypeptide of interest, comprising:
- contacting a subject with an attenuated bacteria, wherein the bacteria lacks an EspA or
 EspB protein and wherein the bacteria contains a polynucleotide encoding a fusion protein
 comprising a Tir polypeptide operably linked to the polypeptide of interest.
- 50. The method of claim 49, wherein the polypeptide of interest is an antigen.
- 51. The method of claim 49, wherein thebacteria is *E.coli*.